

as well as for horses and bullocks." But it is only grass after all, and we can hardly believe that it can be superior to the herbage from which it was made. Pigs and poultry will graze in pastures it is true, but the digestive systems of these animals demand more concentrated foods. There is an evident tendency to "forget the rock from which it was hewn," if we may apply such words to the process of ensilage. It is green fodder *preserved* until winter. Well! if preserved until winter it cannot be eaten in summer. If eaten in summer it surely would also have been realised.

It may be better than hay, but we cannot expect from ensilage such superlative results above what might reasonably be expected from hay. Such high-flown anticipations as are embodied in Prof. Rogers's book are usually doomed to disappointment, and the process of ensilage will probably take its place in American and English agriculture as it has already taken its place in the agriculture of the Continent of Europe, among other improvements of the nineteenth century, but without overtaking any of them.

Prof. Rogers does not appear to have informed himself as to the state of our knowledge in England upon this topic. The process was fully described by the present writer for the Royal Agricultural Society in 1874. He also drew attention to it in two letters to the *Times* in 1875, when it evoked considerable discussion, under the title of "Potted Hay." The process was also both described and illustrated by drawings in the *Agricultural Gazette* at the same period. Since then it has been repeatedly tried, but in all cases without marked success. We are ready to allow that this want of success has been due to the experiments having been conducted upon a small scale and probably with too much regard to economy of outlay. The process is too generally successful in many countries to be capable of being challenged. So late, however, as 1875 Prof. Tormay of Pesth wrote to us that practical men were greatly divided as to its value. No doubt the making of sourhay deserves further trial, and there is as little doubt that it will be largely experimented upon during the coming summer. It must, however, be remembered that it may be as profitable to eat the herbage when growing, as to preserve it *in any form* for the winter. Also that our turnips, swedes, and mangels give us a means of producing meat in these countries which is not possessed by American agriculturists. Turnips and hay are probably a better combination of succulent and dry food for winter feeding than turnips and ensilage would be. In this matter we prefer to suspend judgment for a while upon the uses of ensilage to the British farmer. At the same time we cordially agree that it is likely to be particularly useful in the Eastern States of America, where the soil and climate are unfavourable to the growth of roots and favourable to the growth of maize. On this point we have abundant testimony in Prof. Rogers's book. A special attraction towards ensilage is that it can be carried out without delay in any weather, and that it saves the anxiety of haymaking.

Those who have tried it in this country complain that it is very difficult to keep the pit good when it has been once opened. Still the process is worthy of more extended trial, and if carried out without too much fear of the

initial expense and risk of failure, may be shown to be of service to English agriculturists.

JOHN WRIGHTSON

OUR BOOK SHELF

Another Book of Scraps, principally relating to Natural History. With thirty-six Lithographic Illustrations from Pen and Ink Sketches of Wild Birds. By Charles Murray Adamson. (Newcastle-on-Tyne: Reid, 1882.)

MR. ADAMSON has been so much amused by the preparation of his first "Book of Scraps" that he has prepared another, and invites our opinion upon it. We cannot say that we have derived much information from looking through his letterpress, although we perfectly agree with him that the study of natural history, which he advocates, "opens out a wide field for the profitable employment of the mind." But the thirty-six illustrations which form the main portion of the book certainly show that the author has studied the forms and habits of wild birds to some purpose, although in an artistic point of view, perhaps, it would not be difficult to criticise the surroundings amongst which he places them. The drawings are a little rough, as Mr. Adamson himself confesses, but no naturalist can turn them over without recognising at once the species which are intended to be portrayed. We have seen pictures in the Royal Academy of which the same remark could not truthfully be made. Mr. Adamson is evidently most at home on the sea-shore. His sea-birds are best. With his woodcocks and partridges we are not so well satisfied. But "Another Book of Scraps" will make a nice addition to a drawing-room table.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

Incubation of the Ostrich

I HAVE received the following letter from Mr. J. E. Harting, and with his permission send it to you for publication. I do so partly in justice to Mr. Harting himself—the letter having been originally written to the *Spectator* in vindication of his own accuracy, and having been rejected by the editor—and partly because I think it desirable that the point in natural history which it discusses should be definitely cleared from the erroneous views which, as I shall presently show, are still prevalent with regard to it.

ANIMAL INTELLIGENCE To the Editor of the *Spectator*

SIR,—I have just read in your issue of February 3 a letter from Mr. G. J. Romanes to which a long editorial note is appended, and which raises an interesting question relating to the incubation of the ostrich. As my name is mentioned as having written something on the subject, perhaps you will allow me to offer a few remarks.

Briefly stated, the point under discussion is this: Mr. Romanes, in his recently-published work on "Animal Intelligence," has observed that in the case of the ostrich *the task of incubation is shared by both the sexes*.

In reviewing this work your critic alleges that "female ostriches take no part in the duty of incubation"—that is, they do not assist the male.

Whereupon Mr. Romanes cites his authorities for the statement made by him, and refers amongst other sources to my book on ostriches, published in 1876, wherein (at p. 41) I remark that "the males are polygamous, each associating with three or four hens, all of which lay their eggs in one large nest scooped

out in the sand, and relieve each other by turns at incubation. Le Vaillant purposely watched an ostrich's nest, and during the day saw four hens sit successively on the same eggs, a male bird coming late in the evening to take his turn at incubation." A little further on, I added : "Incubation lasts six weeks, the cock-bird taking his turn at sitting like the hens."

Your reviewer, still sceptical, replies : "The passage in Mr. Harting's book is based on the statement of Le Vaillant, whose observations, except when confirmed by later experience, are justly discredited by the best-informed naturalists of the present day, as he was notoriously so often unworthy of belief."

Permit me to point out that in making the statement above quoted, I by no means relied *solely* on Le Vaillant. I had before me the evidence of several modern observers on the subject, whose publications are referred to in my "List of Works quoted," at the commencement of my volume. At p. 189 I have alluded to the experiments made at San Donato, near Florence, in 1859 and 1860, by Prince Demidoff, who says that "the female ostrich began to sit as soon as the first egg was laid, and sat for three hours daily, leaving the male for the rest of the time."

At p. 196, quoting a report forwarded in 1873 by a resident of experience in South Africa to the Council of the Zoological and Acclimatisation Society of Victoria, who were then contemplating the introduction of the ostrich into that colony, I find this distinct statement : "The process of hatching is performed by the male and female sitting alternately, one keeping a vigilant look-out as sentry, as well as procuring food."

Again, in a Report by Dr. W. G. Atherstone of Grahamstown, based on observations made by himself and friends on different ostrich farms in the neighbourhood of Grahamstown, and quoted by me *in extenso*, the following passage occurs on p. 202 of my book :—"They sit alternately, the male at night grazing and guarding the females. During the daytime, the time of the male bird going on the nest varies during the period of incubation, as also does the time between the female leaving the nest and the male taking her place, the exposure and cooling being probably regulated by the temperature of the incubation fever at different stages."

In addition to the evidence of these observers I had before me the testimony of Mr. F. Denny of Grahamstown, which is too long to be quoted here, but which will be found embodied in an interesting note published in the *Zoologist* for 1874 (p. 3916); so that I felt perfectly justified in asserting in effect, as Mr. Romanes has done, that *the task of incubation with the ostrich is shared by both the sexes*. It would be easy to adduce further evidence on the subject if necessary, but I will not occupy space further than to observe that if your reviewer will turn to p. 107 of Douglass's "Ostrich Taming in South Africa," published by Messrs. Cassell and Co. in 1881, he will see a full-page illustration thus lettered, "Hen bird sitting. From a photograph taken at Heatherton Towers."

Admirers of Le Vaillant will be glad to learn that in this case at least his assertions (to quote your reviewer) "have been confirmed by later experience," and are therefore not to be discredited.—I am, Sir, your obedient servant,

22, Regent's Park Road, N.W.

J. E. HARTING

After such a battery of evidence it seems almost needless to adduce more; but as the point is an interesting one to ornithologists, I shall briefly add some corroborative proof from other sources.

In the *Spectator*, besides referring to the above, I gave a reference to two articles published by Mr. E. B. Biggar on the ostrich-farms of the Cape Colony, and also to the recently published work by Mr. Nicols; from each of these sources I shall now quote brief passages. Mr. Biggar writes as follows :—

"Some will sit throughout with the most solicitous maternal instinct; . . . others manifest such anxiety, that when the hen has been a little late in taking her morning turn upon the nest, he has gone out, and, hunting her up, has kicked her to the nest in the most unmanly manner. Some are very affectionate over their young, others the reverse; thus do individuals differ even among ostriches. As a rule the cock bird forms the nest, sits the longest, and takes the burden of the work of hatching and rearing. Contrary to what has been currently understood, and what is still stated even in recent colonial accounts, the cock bird sits at night, not the hen. In this peculiarity the hand of Providence may be seen, for the worst enemies of the nest appear at night, and the cock, being stronger and braver, is better able to resist them; moreover, the feathers of the cock

being black, night sitting would not expose him to that exhaustion from the sun's rays which would ensue if he sat during the day; while at the same time time the grey feathers of the female are less conspicuous while she sits during the day."—*Field*, August 21, 1880.

And again, "After turning the eggs over one by one with her beak, she will sit perhaps for hours with her head stretched flat and snake-like on the ground, and her body as motionless as a mound of earth. Occasionally, on hot days, she may be seen with her body lifted slightly out of the nest to admit a current of air over the eggs; and sometimes she will even leave the nest for two or three hours, till instinct tells her that the lowering temperature requires her return" (*Century*, January, 1883).

Mr. Nicols' work, entitled "Zoological Notes," repeatedly states that the hen bird assists the cock in the process of incubation, and on my writing to him to ask whether he had witnessed the fact, he answers that although he has not done so himself, a well-educated friend "who had passed some time in visiting ostrich-farms in South Africa" had done so; and, in answer to his express inquiry on the subject, wrote, "that the female took part in the task, though not nearly to so great an extent as the male," adding that he was surprised to hear there should be any question concerning a fact so well known to the ostrich farmers.

Lastly, having recently been to Florence, I took the opportunity of calling upon the superintendent and proprietor of the Zoological Gardens there, and obtained all the particulars of the case alluded to by Mr. Haring in the above letter as having occurred at San Donato. I found that two broods of young had been raised in successive years by the same pair of ostriches, and that on both occasions the female assisted the male to incubate the eggs : "que le male et la femelle couvent alternativement," in the words of the published report ("Guide du R. Jardin Zoologique de Florence," p. 81, 1868). Here, however, as in all the previously-mentioned cases, the fact which I stated in "Animal Intelligence" was apparent, viz. that the cock bird undertook the whole duty of sitting during the night.

Now when all this evidence is taken together it appears to me impossible to doubt that the female ostrich assists the male in the process of incubation. Yet from the fact of this evidence not having been clearly focused, an old error in the subject still appears to be prevalent. This error arose some twenty years ago from the observations of M. Noel Suchet (?) or Suquet) on a pair of ostriches kept in confinement. Thus, in 1863, Dr. Slater wrote :—"We now know with certainty from the observations of M. Noel Suchet, Director of the Zoological Gardens at Marseilles, that the normal habits of the ostrich (as regards incubation) do not differ materially from those of its allies of the same family" (*Proc. Zool. Soc.*, 1863, p. 233); and Mr. Darwin, following the judgment formed by Dr. Slater, wrote in the "Descent of Man" (p. 479) that the male bird "undertakes the whole duty of incubation." Again, my reviewer in the *Spectator*—who, although curiously weak in his logic, appears to be strong in his ornithology—pins his faith entirely to this single observation of M. Suchet. Lastly, Prof. Newton in his article on "Birds" in the "Encyclopaedia Britannica" (p. 771), relying, I presume, on the same observation, writes :—"A band of female ostriches scrape holes in the desert sand, and therein promiscuously dropping their eggs, cover them with earth, and leave the task of incubation to the male, who discharges the duty thus imposed upon him by night only, and trusts by day to the sun's rays for keeping up the needful fostering warmth."

Thus it appears that the influence of M. Suchet's observations has been very disproportionate to its merits, and has misled some of our principal ornithologists concerning the normal habits of ostriches.¹ Possibly Prof. Newton, with his extensive knowledge of the literature of such matters, and writing since the appearance of most of the counter-evidence which I have given, is cognisant of some other observations on which he rests his statement. But, if so, it becomes desirable that he should supply his references, as otherwise his statement appears to rest, as my reviewer in the *Spectator* would say, "simply on the survival of the old belief."

GEORGE J. ROMANES

March 12

Difficult Cases of Mimicry

I HAVE received from Mr. Thos. Blakiston, of Tokio, Japan, a communication to the *Japan Mail* by himself and Prof. Alexander,

¹ I may observe that Mr. R. B. Sharpe, writing in "Cassell's Natural History" (vol. iv. p. 228), has not been thus misled, for he says distinctly that the cock and hen "relieve each other by turns."